

**NERRS Science Collaborative Progress Report for the Period 9/22/2010 through  
02/28/2011**

**Project Title:** Assessing Coastal Uplift and Habitat Changes in a Glacially Influenced Estuary System Located in Kachemak Bay, Alaska

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**Contributing team members and their role in the project:** Carmen Field, Education and Outreach; Catie Bursch, Education and Outreach

- A. **Progress Overview:** In Kachemak Bay, the landscape is uplifting faster than the sea level rises on a global scale. The coastal uplift is due to after-effects from the 1964 earthquake, the steady buildup of strain for the next big earthquake, and rapid melting of heavy ice contained in local glaciers and ice fields. In the balance of these conflicting forces are the communities surrounding Kachemak Bay, which depend on near-shore fisheries for food and safe harbor infrastructure for transportation. To plan for a future in this uncertain landscape, local communities need better information on rates of change for coastal uplift and regional sea level rise and how these forces will impact community services and local ecology. Our goal is to provide this information to our coastal decision makers in local communities. This study builds upon existing work on coastal processes developed by the University of Alaska, Fairbanks (UAF) and monitoring and mapping of salt marsh habitats by the Kachemak Bay Research Reserve (KBRR).

Our project officially began on 30 August, 2010 and funding was transferred to KBRR by 22 September, 2010. In our initial plan, we were to conduct the following outreach: a newspaper article, a one-page project description, present to the Community Council, and hold two Discovery Labs (Citizen Science Monitoring and Landscape Changes). Upon receiving the grant, communication was robust. We developed a communication plan for the project, developed a press release for a newspaper article in Homer that was picked up by the Anchorage Daily News, participated in two radio interviews (one at the beginning of the project and one about 3 months into the work), created a Kachemak Bay Research Reserve one-page project description, and aided UNH in developing their overview of our Science Collaborative project. We provided 2 presentations to the KBRR Community Council, 1 presentation to the City of Homer at their monthly City Council meeting, and 1 presentation to the local Rotary Club. Two successful Discovery Labs were held - one in September 2010 and one in February 2011.

We held our first Core Intended Users (CIU) meeting on 30 November, 2010 (5hrs) which included all project principal investigators, 11 CIU, and KBRR support staff. We made presentations on Collaborative Learning methods, modeling land and sea level change methods, and methods for monitoring land and water-level changes

and biological diversity in salt marsh habitat. We began discussions on how these data would be useful and used by the respective CIUs. Meeting minutes were circulated to all participants by way of our website (CIUs indicated that this was the best method of document sharing) as well as copies of the presentations. In our initial plans, we projected having a second CIU meeting during this reporting period. As a group, we decided to schedule the remaining quarterly meetings to occur prior to our regularly scheduled KBRR Community Council meeting as this was efficient for people who would be traveling to attend both meetings. As a result, we have a schedule of the rest of our meeting dates for calendar year 2011.

In this reporting period, we purchased and installed 2 Continuously Operating GPS Reference Stations (CORS) with the cooperation of the City of Homer and McNeil Elementary School. Because Trimble Navigation released a new and less expensive receiver just before the project was funded, and the Geophysical Institute at UAF was able to provide some supplementary funds, we were able to purchase two additional receiver systems. We plan to install one and perhaps two additional CORS sites this spring, and site selection and permitting processes are ongoing. Working with an ongoing NERRS Biomonitoring project, we completed the installation of 3 vertically stable benchmarks in each of 2 study sites (Fox River Flats and Beluga Slough) but have not started the extensive GPS campaigns at these sites. Following NERRS protocols, we completed monitoring of vegetation composition and percent cover at permanent plots in Fox River Flats and Beluga Slough. We selected 2 additional salt marsh sites (Sadie Cove and China Poot) and are in the process of obtaining permits to set benchmarks and establish long-term monitoring transects in those. We purchased 2 high-precision GPS units (Sokkia) and leveling equipment which meet NERR program standards; with additional savings on overhead from our University of Alaska Fairbanks contract, we plan to purchase a 3<sup>rd</sup> unit. We are also in the process of reviewing training methods for citizen science sampling the biological diversity at all salt marsh sites.

#### **B. Working with Intended Users:**

- **Describe the progress on tasks related to the integration of intended users into the project for this reporting period.** During the first CIU meeting on November 30<sup>th</sup>, 2010, the Collaborative Learning process was outlined for all project participants and all joined in a spirited discussion that helped shape the group's collaborative process. Action items that resulted from this first meeting, such as creating a data-user contact list and posting Science Collaborative materials on the KBRR website, have been created and are available for ongoing updates.
- **What did you learn? Have there been any unanticipated challenges or opportunities?** We learned that there exists an lack of familiarity with the scientific method, and therefore a distrust for the scientific research process. This project creates new opportunities to discuss what science method is and is not in future CIU meetings and outreach events. We also learned that our CIUs are comfortable speaking their mind and sharing information, which greatly facilitates the exchange of ideas.

- **Who has been involved?** The principal investigators and the CIUs have all been involved. Additional users of the data have been contacted and will be notified of upcoming Science Collaborative meetings and outreach events.
- **Has interaction with intended users brought about any changes to your methods for integration of intended users, the intended users involved, or your project objectives?** Thus far, no changes to the methods or sampling have been recommended by our CIU.
- **How do you anticipate working with intended users in the next six months?** In the next six months, we have two CIUs meetings. In the first meeting, one of our CIUs will be giving a short presentation on his work along the Anchor River area and will provide us with better information on how we can help apply the data collected in our study to the land use problem. We will also circulate a report from North Carolina on regional sea level rise written for coastal decision makers and get feedback from the CIUs about the utility of the report content and presentation relative to their needs. The second CIU meeting will be a similar format, with a presentation from our local Harbor Master and follow up with review and comment on a regional sea-level rise report for lower Cook Inlet.

### **C. Progress on project objectives for this reporting period:**

- **Describe progress on tasks related to project objectives for this reporting period.**  
Below are some of the tasks we are planning to accomplish and our progress in doing so.
  - a. Establish a long-term monitoring program to continue monitoring land and sea level changes over time in salt marshes
    - i. Prior to the start of the Science Collaborative Project, we installed vertically stable benchmarks, set permanent vegetation transects, and validated previous vegetation mapping efforts in 2 salt marsh monitoring sites as part of our Biological Monitoring project.
    - ii. We began the site selection process for additional long-term monitoring sites, permitting, and equipment purchases.
    - iii. We established permanent 2 CORS sites, which are now actively collecting data, and we are researching a additional potential sites.
  - b. Provide the local communities with a team of well-trained citizen scientists who will be able to participate in future monitoring activities with the Reserve
    - i. In September, we held a Discovery Lab on citizen science monitoring in Kachemak Bay and had a table specifically focused on the Science Collaborative project.
    - ii. In February, we held a Discovery Lab on ‘Landscape Changes Over Time’ with a table specifically for the Science Collaborative project. We had a flyer introducing the citizen science monitoring opportunities during the course of this study.
  - c. Support our intended users of the information so that they know how to apply the information generated from the study and will be fluent in the ideas, methods, and

terms that describe geological and biological changes which influence coastal uplift and sea level rise

- i. See bi and bii on the Discovery Labs
- ii. In our CIU meeting, inclusion of new CUIs was discussed and two new people were invited to participate in the meetings.

- **Identify additional users of the information**

- a. Additional participants for the CIU meeting were generated in the first meeting with follow-up suggestions provided via email correspondence.
- b. Through our CTP programs and outreach of the science collaborative, we have been in contact with several regional efforts by federal, state, and private entities recording high precision GPS measures in proximity to our study areas.

- **What data did you collect?**

- a. Since November 3<sup>rd</sup> we have been collecting high-precision, vertically stable, GPS locations at our 1<sup>st</sup> CORS site; similar data on the second site has been collected since January 7<sup>th</sup>.
- b. Plant diversity, percent cover, and height at plots along permanent transects in Fox River Flats and Beluga Slough

- **Has your progress in this period brought about any changes to your methods, the integration of intended users, the intended users involved or the project objectives?**

- a. None to date

- **Have there been any unanticipated challenges, opportunities, or lessons learned?**

- a. None to date with the caveat that we are continually learning new lessons

- **What are your plans for meeting project objectives for the next six months?**

- a. In the near term, we will be working on permit applications for the next study sites and biological sampling procedures
- b. We will have two more CIU meetings (see descriptions above) on 16 March and 25 May and we will have two KBRR community council meetings.
- c. We will develop and host a Discovery Lab on 'Science in the Field' which provides training to citizen scientists specifically for this project. In August, the principal investigators and the citizen science monitors will do two sampling events in our study areas.
- d. We will install a 3<sup>rd</sup> CORS site on the south-side of the Bay, and possibly a 4<sup>th</sup> site if everything goes well.
- e. We will establish benchmarks and permanent vegetation transects on two new sites. All 4 sites we will have the vegetation plots analyzed or reanalyzed, temperature, water-level loggers will be installed and monitored, and sediment elevation changes will be determined.

**D. Benefit to NERRS and NOAA: List any project-related products, accomplishments, or discoveries that may be of interest to scientists or managers working on similar issues, your peers in the NERRS, or to NOAA. These may include, but are not limited to, workshops, trainings, or webinars; expert speakers; new publications; and new partnerships or key findings related to collaboration or applied science.**

- a. A major benefit to the NERRS is that KBNERR has acquired high-precision GPS and leveling equipment which meets the national program standards. This results in one less reserve needing to borrow the shared equipment.
  - b. By setting up the long-term vegetation transects utilizing the national program's methods, it ensures that these data will be compatible with NERRS protocols which is a benefit.
  - c. By modeling sea and land-level changes with high precision, we are contributing valuable information to our partners in the National Park Service, U.S. Geological Survey, and U.S. Fish and Wildlife Service who are currently relying on the SLAMM model for sea level rise without the benefit of land-level change.
- E. Describe any activities, products, accomplishments, or obstacles not addressed in other sections of this report that you feel are important for the Science Collaborative to know.**
- a. We have not identified any additional obstacles at this point.



Installation of a CORS site at the City of Homer water treatment plant fall 2010